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Mazdoor Kisan Shakti Sangathan

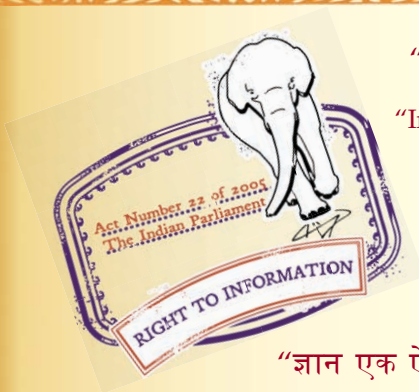
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“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 6767-2 (1972): Direct Reading Pointer Indicator Type
ac/dc Electronic Voltmeter, Part 2: Up to 30 Mhz [LITD 8:
Electronic Measuring Instruments, Systems and Accessories]



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Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS : 6767 (Part II) - 1972

(Reaffirmed 2000)

Indian Standard

“पुनःपठ १९९५”

“RE-AFFIRMED 1995”

SPECIFICATION FOR
DIRECT READING POINTER INDICATOR
TYPE ac/dc ELECTRONIC VOLTMETER

PART II UP TO 30 MHz

(First Reprint AUGUST 1984)

UDC 621.317.725:621.38



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INDIAN STANDARDS INSTITUTION

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR DIRECT READING POINTER INDICATOR TYPE ac/dc ELECTRONIC VOLTMETER

PART II UP TO 30 MHz

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*SHRI Y. VENKATARAMIAH

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*Shri Y. Venkataramiah was Chairman for the meeting in which this standard was finalized.

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Indian Standard

SPECIFICATION FOR DIRECT READING POINTER INDICATOR TYPE ac/dc ELECTRONIC VOLTMETER

PART II UP TO 30 MHz

0. FOREWORD

0.1 This Indian Standard (Part II) was adopted by the Indian Standards Institution on 7 December 1972, after the draft finalized by the Electronic Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 The provisions of this standard apply to the complete apparatus and not to component parts thereof.

0.3 This standard is to be used in conjunction with IS : 6767 (Part I) - 1972* and IS : 3437-1972†.

0.4 Assistance has been derived from the following while preparing this standard:

IEC Pub 217 Electronic voltmeter. International Electrotechnical Commission.

BS 4205 : 1967 Specification for electronic voltmeters. British Standards Institution.

0.5 This standard is one of the series of Indian Standards on electronic measuring equipment. A list of standards so far published in the series is given on page 10.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960‡. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Specification for direct reading pointer indicator type ac/dc electronic voltmeter: Part I Methods of measurements.

†General requirements for direct reading pointer indicator type electronic voltmeter (first revision).

‡Rules for rounding off numerical values (revised).

IS : 6767 (Part II) - 1972

1. SCOPE

1.1 This standard (Part II) lays down the minimum performance requirements and characteristics to be specified for direct reading pointer indicator type ac/dc electronic voltmeter operating up to 30 MHz.

1.2 The climatic and mechanical durability requirements of these voltmeters are under consideration.

2. TERMINOLOGY

2.1 For the purpose of this standard the definitions and explanation of terms specified in 2 of IS : 3437-1972* shall apply.

3. CONSTRUCTIONAL REQUIREMENTS

3.1 The provision of 3 of IS : 3437-1972* shall apply as modified by 3.1.1.

3.1.1 The panel-meter shall have a minimum 100 divisions, each division being of 0.8 mm width.

4. WORKMANSHIP AND FINISH

4.1 The provisions of 5 of IS : 3437-1972* shall apply.

5. CONTROLS AND ADJUSTMENTS

5.1 The provisions of 6 of IS : 3437-1972* shall apply.

6. POWER SUPPLY

6.1 The provisions of 7 of IS : 3437-1972* shall apply.

7. CHARACTERISTICS OF ELECTRONIC VOLTMETERS

7.1 Basic Characteristics

7.1.1 Accuracy Class — The accuracy classes of 2.5 and 5 are covered in this standard [see also 2.8.2 and 4.1 of IS : 3437-1972*].

7.1.2 Permissible Intrinsic Error — The permissible intrinsic error under reference conditions and between the limits of the effective range shall be ± 2.5 percent or ± 5 percent.

7.1.3 Voltage Range

7.1.3.1 DC voltage range — The instrument shall be capable of measuring dc voltages from at least 1 V full scale deflection up to 300 V full scale deflection in suitable ranges.

*General requirements for direct reading pointer indicator type electronic voltmeter (first revision).

7.1.3.2 AC voltage range — The instrument shall be capable of measuring ac voltages from at least 1 V full scale deflection up to 300 V full scale deflection in suitable ranges.

7.1.3.3 The instrument may also be calibrated in decibels and a separate dB scale shall be provided.

7.1.3.4 The ratings of effective ranges shall preferably be chosen from the following basic series or their decimal multiples or fractions [see 3.4.1 of IS : 3437-1972*]:

- a) 1, $\sqrt{10}$, 10 (for voltage and dB); and
- b) 1, 3, 10 (for voltage).

7.1.4 Calibration — The calibration shall be for rms values. If it is otherwise, such as peak, average or logarithmic, it shall be indicated on the instrument.

7.1.5 Type of Input — The type of input shall be single ended. Other types of input such as symmetrical or differential may be provided.

7.1.6 Input Admittance/Impedance

7.1.6.1 For dc ranges — Input resistance shall be at least 10 megohms.

7.1.6.2 For ac ranges — The ac input impedance expressed in terms of its equivalent parallel resistive and reactive components at 1 MHz shall be as follows:

Input resistance — 1 megohm

Input capacitance — 10 pF maximum

7.1.7 Warm-up Period — The time taken by the instrument to attain good stability within the intrinsic error specified shall not be greater than 15 minutes.

7.2 Other Characteristics

7.2.1 Deviation of Electrical Zero — The permissible shift or deviation of electrical zero for the two classes of voltmeters covered by the standard (see 7.1.1) shall be as specified in Table 1 for various influence quantities.

7.2.2 Variation in Indication — The permissible variation in indication for the two classes of voltmeters covered by the standard (see 7.1.2) shall be as specified in Table 2 for various conditions.

*General requirements for direct reading pointer indicator type electronic voltmeter (first revision).

TABLE 1 SHIFT OR DEVIATION OF ELECTRICAL ZERO

(Clause 7.2.1)

INFLUENCING QUANTITY	SHIFT OR DEVIATION OF ELECTRICAL ZERO		CL REF OF IS : 6767 (Part I) - 1972*
	Class Index	Class Index	
	2.5 percent	5.0 percent	
a) Ambient temperature change	± 2.5	± 5.0	5.6
b) Supply voltage change:			5.5
1) First sudden 5 percent variation (maximum shift)	± 1.25	± 2.5	
2) Second sudden 5 percent variation (final shift)	± 2.5	± 5.0	
c) Fluctuation	± 1.25	± 2.5	5.1
d) Drift	± 2.5	± 5.0	5.2
e) Applied input voltage	± 2.5	± 5.0	5.3
f) Change of range	± 2.5	± 5.0	5.4

NOTE — The shift or deviation of electrical zero shall be expressed as percentage of the total scale length.

*Specification for direct reading pointer indicator type ac/dc electronic voltmeter: Part I Methods of measurements.

7.2.3 Damping — The damping of a voltmeter characterized by its overshoot and settling time, shall be measured in accordance with 9 of IS : 6767 (Part I) - 1972* and shall specify the following requirements:

- Overshoot** — Under the test conditions, the overshoot shall not exceed the upper limit of effective range.
- Settling Time** — Under the test conditions the time required for the index to attain its final steady position within 1.5 percent of the upper limit of the effective range shall not exceed 4 seconds.

7.2.4 Errors Due to Overload

7.2.4.1 After being subjected to the continuous overload test in accordance with 10.1 of IS : 6767 (Part I) - 1972*, the voltmeter shall comply with the requirements of its specified accuracy.

*Specification for direct reading pointer indicator type ac/dc electronic voltmeter: Part I Methods of measurements.

TABLE 2 VARIATION IN INDICATION

(Clause 7.2.2)

INFLUENCING QUANTITY	VARIATION IN INDICATION		CL REF OF IS: 6767 (Part I)- 1972*
	Class Index 2.5 percent	Class Index 5.0 percent	
a) Position	± 2.5	± 5.0	6.1
b) Ambient temperature change	± 2.5	± 5.0	6.2
c) External magnetic field:			11
1) When specified by the manufacturer	± 2.5	± 5.0	
2) At 0.5 millitesla (when not specified by the manufacturer)	± 3.0	± 3.0	
d) External electric field	Under consideration		12
e) External RF electromagnetic field	Under consideration		13
f) Supply voltage change:			6.3
1) First sudden 5 percent variation (maximum variation)	± 1.25	± 2.5	
2) Second sudden 5 percent variation (final variation)	± 1.25	± 2.5	
g) Super-imposed input voltage:			6.4
1) On ac, 1 000 times dc voltage being applied	± 2.5	± 5.0	
2) On dc, 1.2 times ac voltage being applied	± 2.5	± 5.0	
NOTE — In either of the cases the maximum voltage applied shall not exceed insulation voltage of the instrument.			
h) Frequency of measured voltage:			8
1) Over 20 Hz to 10 MHz	± 2.5	± 5.0	
2) Over 20 Hz to 30 MHz	± 5	± 10	
j) Fluctuation (random and spurious variation)	± 1.25	± 2.5	6.5
k) Drift	± 2.5	± 5.0	6.6

*Specification for direct reading pointer indicator type ac/dc electronic voltmeter: Part I Methods of measurements.

IS : 6767 (Part II) - 1972

7.2.4.2 After being subjected to the test for overload for short duration in accordance with **10.2** of IS : 6767 (Part I)-1972* the voltmeter shall comply with the requirements of its specified accuracy.

8. MARKING

8.1 The provisions of **8** of IS : 3437-1972† shall apply in addition to **8.1.1**.

8.1.1 The instrument may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

9. TECHNICAL DOCUMENTATION TO BE SUPPLIED WITH THE INSTRUMENT

9.1 The provisions of **9** of IS : 3437-1972† shall apply.

*Specification for direct reading pointer indicator type ac/dc electronic voltmeter: Part I Methods of measurements.

†General requirements for direct reading pointer indicator type electronic voltmeter (first revision).

IS : 6767 (Part II) - 1972

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Members

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SHRI J. S. MONGA
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SHRI D. V. S. RAJU

SHRI C. S. RANGAN

SHRI M. T. SRIVATSA (Alternate)

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INDIAN STANDARDS

ON

ELECTRONIC MEASURING EQUIPMENT

IS:

- 2320-1963 Methods of measurements for amplitude modulated radio frequency signal generators (30 kc/s to 30 Mc/s)
- 2321-1963 Requirements for general purpose amplitude modulated radio frequency signal generators (30 kc/s to 30 Mc/s)
- 2711-1966 Direct reading pH meters (*revised*)
- 3437-1972 General requirements for direct reading pointer indicator type electronic voltmeter (*first revision*)
- 3886-1966 Minimum requirements for general purpose audio frequency signal generators (30 c/s to 30 kc/s)
- 3915-1966 Methods of measurements on audio frequency signal generators (30 c/s to 30 kc/s)
- 4309-1967 Methods of measurement on direct reading pH meters
- 4330-1967 Methods of measurements on cathode-ray oscilloscope (dc to 10 Mc/s)
- 6700-1972 Requirements for general purpose cathode-ray oscilloscope
- 6756-1972 Technical documentation to be supplied with electronic measuring equipment
- 6767 (Part I)-1972 Direct reading pointer indicator type ac/dc electronic voltmeter:
Part I Methods of measurements
- 6767 (Part II)-1972 Direct reading pointer indicator type ac/dc electronic voltmeter:
Part II Up to 30 MHz
- 6767 (Part III)-1972 Direct reading pointer indicator type ac/dc electronic voltmeter:
Part III Up to 300 MHz
- 6769 (Part I)-1972 Direct reading pointer indicator type ac electronic millivoltmeter:
Part I Methods of measurements
- 6769 (Part II)-1972 Direct reading pointer indicator type ac electronic millivoltmeter:
Part II With a frequency range of 2 Hz to 1 MHz
- 6804-1972 Glass electrodes for direct reading pH meters

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 26 60 21, 27 01 31

Telegrams : Manaksanstha

Regional Offices:

Telephone

Western : Novelty Chambers, Grant Road

BOMBAY 400007

6 32 92 95

Eastern : 5 Chowringhee Approach

CALCUTTA 700072

27 50 90

Southern : C. I. T. Campus

MADRAS 600113

41 24 42

Northern : B69, Phase VII

S.A.S. NAGAR

8 78 26

(MOHALI) 160051

Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur

AHMADABAD 380001

2 03 91

'F' Block, Unity Bldg, Narasimharaja Square

BANGALORE 560002

22 48 05

Gangotri Complex, Bhadbhada Road, T. T. Nagar

BHOPAL 462003

6 27 16

22E Kalpana Area

BHUBANESHWAR 751014

5 36 27

5-8-56C L. N. Gupta Marg

HYDERABAD 500001

22 10 83

R 14 Yudhister Marg, C Scheme

JAIPUR 302005

6 98 32

117/418 B Sarvodaya Nagar

KANPUR 208005

4 72 92

Patliputra Industrial Estate

PATNA 800013

6 28 08

Hantex Bldg (2nd Floor), Rly Station Road

TRIVANDRUM 695001

32 27